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(71) Applicant

Georg Fischer Aktiengesellschaft

(Incorporated in Switzerland)

CH-8201 Schaffhausen, Switzerland

(72) Inventors

Jakob Rohr

Hans Kopp

(74) Agent and/or Address for Service

Haseltine Lake & Co

**Hazlitt House, 28 Southampton Buildings,
Chancery Lane, London, WC2A 1AT**

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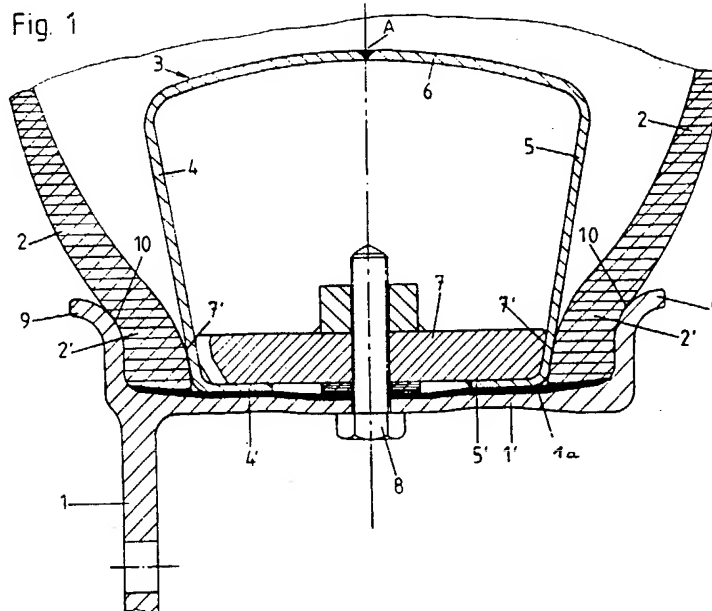
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(54) **Emergency running insert for pneumatic tyres**

(57) The insert 3 is formed from several arc-shaped segments. Each segment has a U-shaped section, the side walls (4, 5) of which are angled inwardly towards the free ends which form supporting surfaces (4', 5'). A clamping plate (7) presses the supporting surfaces (4', 5') against the wheel rim 1. In the assembled condition the tyre beads (2') are held firmly between the insert (3) and the wheel flanges (9).



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Fig. 1

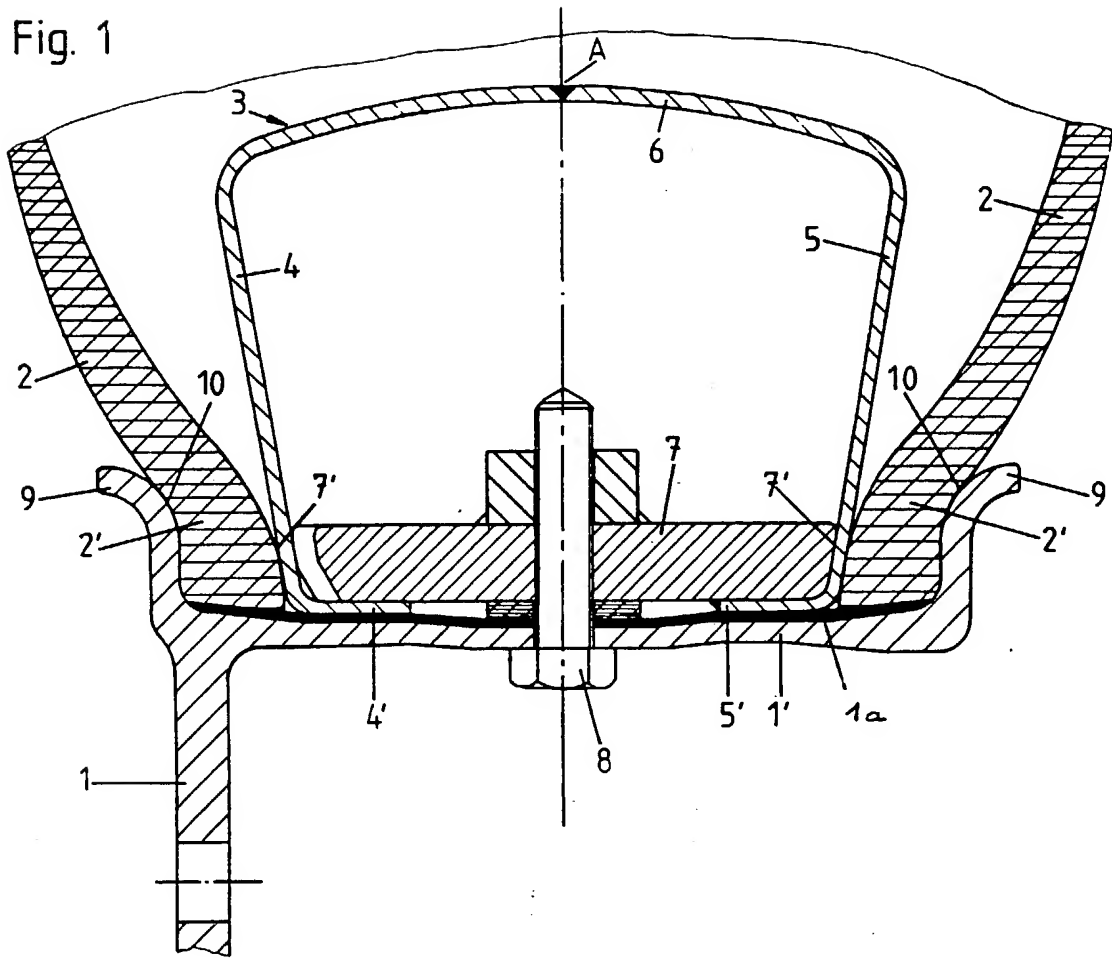
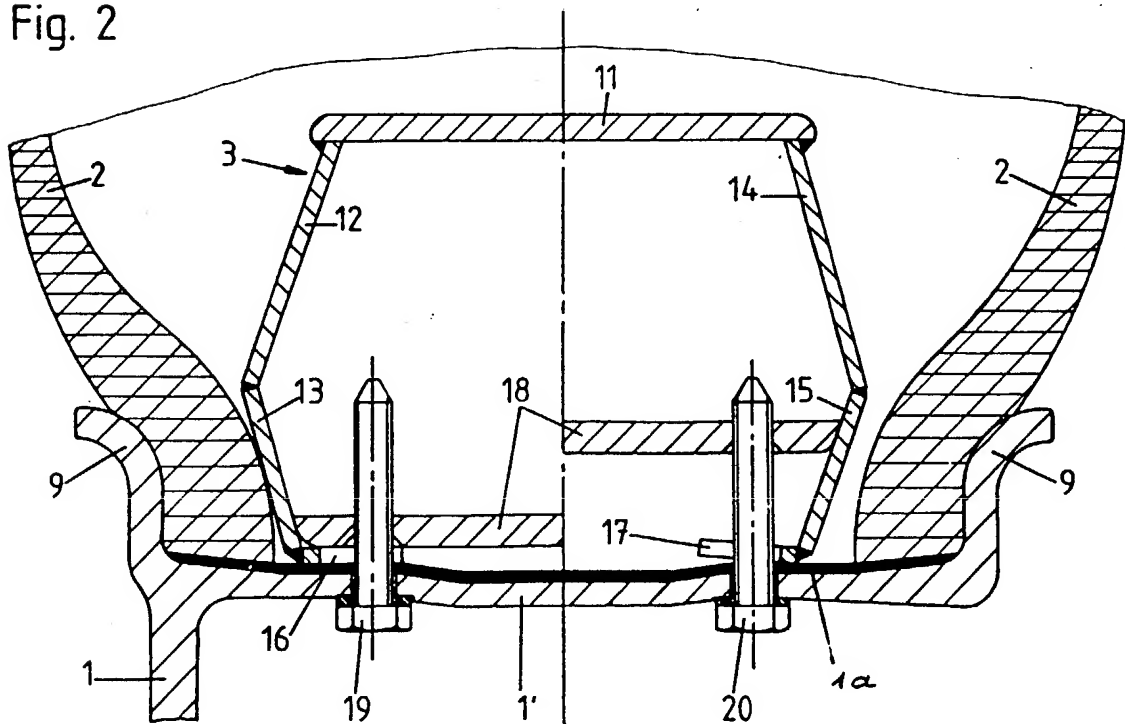


Fig. 2



EMERGENCY RUNNING INSERT FOR WHEELS
HAVING PNEUMATIC TYRES

5 The invention concerns an emergency running insert, formed from several arc-shaped segments, for the rims of pneumatic tyre wheels.

10 Various constructions of emergency running wheels have already been suggested for wheel rims, these normally being built for one-part rims, even if they are constructed as segment-formed inserts. The basic principle of the known suggestions is that of forming a rigid or firm auxiliary wheel, projecting radially outwards from the actual rim, in the interior of the tubeless pneumatic tyre fitted to the rim. These auxiliary wheels could either be constructed as an integral component part of the rim or as segments fastened in the rim bed in a detachable manner. Particular attention was paid in the known constructions to the freedom of movement of the tyre bead with inflated or depressurised tyre.

20 An object of the present invention is to create an emergency running insert formed of arc-shaped segments, which is also easily mountable on existing rims and the construction of which guarantees improved running properties.

25 According to the invention there is provided an emergency running insert for pneumatic tyre vehicle rims, comprising at least two arc-shaped segments, with means for fastening these in the bed of the rim, wherein each segment has a substantially U-shaped section, consisting of two sidewalls connected by a bridge part, with the free ends of the sidewalls angled inwards in order to form supporting surfaces for the installation of the segment on the rim bed, and for each segment there is provided at least one fastening element for pulling the angled ends of the emergency

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running segment down onto the rim bed.

5 The box section is preferably deformable under the effect of external forces, for example, elastically deformable or capable of being indented, at least in the region of the bridge part.

10 With a particularly preferred embodiment at least the end sections of the sidewalls of the box section extend with an inward inclination and give the box section a wedge shape in order to clamp the tyre bead between it and the wheel flanges in the assembled condition, or, with a suitable inclination of the sidewalls and the inner wall of the wheel flanges, to hold this bead fixed.

15 At the ends of the arc-shaped segments the box sections have preferably supporting bars, which connect the box sidewall ends together. With this arrangement the box section form is conserved when under strain, even in the regions not supported by the fastening elements.

20 The box section is made preferably of sheet steel and its sidewalls are able to be bent in an elastic manner relative to the connecting bar.

25 When the bridge part is outwardly curved it can be indented in places by the forces occurring when actually operating the emergency running insert, which leads to an increasing stiffening.

30 When the box section has sidewalls inclined inwards the width of the fastening element constructed as a clamping plate is preferably greater than the spacing of the sidewalls at their outer ends, so that the plate can serve as an expanding element for the section flank.

35 For a better understanding of the invention, embodiments will now be described with reference to the accompanying drawings, in which:

Figure 1 shows a cross section, which is purely diagrammatic, through a pneumatic-tyre-vehicle wheel with a first embodiment of an emergency running insert and

5 Figure 2 shows a view similar to that in Figure 1 of a vehicle wheel with a further embodiment of an emergency running insert.

10 Figure 1 shows a section of a pneumatic-type-vehicle wheel with a rim 1, a tubeless tyre 2 and an emergency running insert 3 in the form of several arc-shaped segments.

15 The rims can in particular be rims for tubeless tyres (e.g. multi-part flat bed, stepped, ring or one-part tapered rims). Since, because of the emergency running insert 3, only tubeless tyres 2 can be used, a sealing element 4, e.g. a sealing band, must also be arranged on the rim bed, to guarantee an airtight termination between rim and tyre. The valve introduction (not shown) and the points of introduction of the fastening screws for the emergency running insert must also naturally be correspondingly sealed.

20 The invention relates to the special design of the emergency running insert 3. With the example shown according to Figure 1 this consists of several, for example three, arc-shaped segments of substantially U-shaped box sections 3, with two sidewalls 4,5 and a bridge part 6, preferably of sheet steel. The free ends 4',5' of the sidewalls 4,5 are angled inwardly and form surrounding supporting surfaces, actually supporting pedestals which, via the sandwiched sealing band 1a, rest on the rim bed 1'. Each segment 3 is, in addition, pulled downwards by way of at least one fastening element comprising a clamping plate 7, which grips behind the supporting surfaces 4',5', by means of tightening bolts 8 passing through the rim bead 1', the

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supporting surfaces or pedestals 4',5' being pressed against the rim bed 1'. In practice at least one clamping plate 7 is used per segment 3. The clamping plates 7 can be arranged loosely in the interior of the box sections 3 or connected to one of the supporting surfaces 4',5', for example, welded. In the last case the box sections 3 have an exactly defined geometric shape.

With the example shown the bridge part 6 is curved outwards, the whole box section consisting of one part or, as shown, of two identical part pieces welded together along line A.

In use, the outwardly curved bridge part is deformed inwards under the effect of external forces, i.e. with a depressurised tyre when the latter rests on the emergency running insert, and the side flanks 4,5 can also be slightly bent. Practice has shown that indentations can occur at regular intervals under the effect of the forces mentioned around the bridge part 6, which offers the whole section an increasing stability and acts automatically against excessive deformation.

As can be seen from the drawing the sidewalls 4,5 are inclined inwards and give the box section 3 the shape of a wedge. If the inclination of the sidewalls 4,5 is greater than the inclination of the inner wall 10 of the wheel flanges 9, a circumferential gap, narrowing outwards, forms between the wall 10 and the opposite sidewall 4 or 5, in which the tyre bead 2' is held fixed or clamped. In each case differences in thickness due to the manufacturing process or other irregularities of the tyre bead 2' or of the tyre 2 can be compensated for, which guarantees a more or less uniform pressing of the tyre onto the wheel flange wall 10 and with this a good torque transfer, even for a

tyre which has become depressurised.

As is known with vehicle wheels with emergency running insert, the assembly of the tyre and the attachment of the emergency running inserts cause some problems which can, however, be overcome by a specialist. Normally the emergency running inserts are brought into the interior of the tyre before it is set on the rims (with a one-part rim or one separated in the middle) or before the rim segments are applied. After this the emergency running inserts must be brought into the assembly positions and firmly screwed by means of suitable tools. With segment rims it is also conceivable to fix the emergency running segments already provisionally on these and then to insert the whole into the tyre. The attachment of the sealing band 4 occurs in the usual way used with multi-part rims.

Through the special design of box section 3 the sidewalls 4,5 are able to be bent flexibly relative to the bridge part 6. If the clamping plates 7 are applied loosely and in addition have a width which is greater than the distance, in the unassembled version, between the sidewalls 4,5, these sidewalls 4,5 can be spread apart by pulling the plates 7 downwards (this is particularly visible from the variation shown in Figure 2). The pressing onto the tyre beads 2' occurs then by stretching the clamping plates 7 downwards, which plates spread the sidewalls 4,5 apart.

As shown the clamping plates 7 have preferably correspondingly inclined side flanks 7', in order to rest with their whole surface on the inner side of the inclined section sidewall 4,5.

Figure 2 of the drawing shows a variation of the box section 3 forming the emergency running insert. The functioning, however, corresponds otherwise to that

of the exemplary form according to Figure 1. In this embodiment the U-shaped box section 3 has a flat bridge part 11 and the sidewalls 12,13 or 14,15, as well as the supporting pedestals 16,17 angled inwards are
5 formed by sheet steel strips welded together. Naturally the bridge part 11 could also be curved outwards and the side flanks could be formed in each case from one part.

Each clamping plate 18 is stretched downwards
10 by two bolts 19,20 in this variation. Only the lower sections 13,15 of the sidewalls are here inclined inwards and have the same effect as the sidewalls 4,5 with the embodiment of Figure 1. The box section 3 here has a wedge shape only in the lower part, which,
15 however, suffices to counter-balance the process tolerances (deviations from desired measurement) of rim and tyre in the way described.

CLAIMS:

1. Emergency running insert for pneumatic tyre vehicle rims, comprising at least two arc-shaped segments, with means for fastening these in the bed of the rim, wherein each segment has a substantially U-shaped section, consisting of two sidewalls connected by a bridge part, with the free ends of the sidewalls angled inwards in order to form supporting surfaces for the installation of the segment on the rim bed, and for each segment there is provided at least one fastening element for pulling the angled ends of the emergency running segment down onto the rim bed.
2. Emergency running insert according to claim 1, comprising at least three arc-shaped segments.
3. Emergency running insert according to claim 1 or 2, wherein the fastening element is adapted to be pulled down onto the rim bed by means of a screw passing through the rim bed.
4. Emergency running insert according to any preceding claim, wherein the box section is, at least in the region of the bridge part, mechanically deformable.
5. Emergency running insert according to claim 4, wherein the box section is elastically deformable.
6. Emergency running insert according to claim 4, wherein the box section is capable of being indented.
7. Emergency running insert according to any preceding claim, wherein the sidewalls of the box section are inclined inwardly in order to give the box section the shape of a wedge body.
8. Emergency running insert according to claim 7, wherein the sidewalls are inclined inwardly only over that part of their radial extent nearest their free ends.
9. Emergency running insert according to claim 7

or 8, wherein the sidewalls are capable of being bent elastically relative to the bridge part.

10. Emergency running insert according to any preceding claim, wherein the box section is of sheet steel.

11. Emergency running insert according to any preceding claim, wherein the bridge part is curved outwards when seen in cross section.

12. Emergency running insert according to any preceding claim, wherein the box section consists of several parts welded together with longitudinal seams.

13. Emergency running insert according to any preceding claim, wherein each fastening element has the form of a clamping plate.

14. Emergency running insert according to claim 13, wherein the width of the clamping plate is greater than the distance between the sidewalls at their free ends in the unassembled condition, in order to serve simultaneously as an expanding element for the sidewalls.

15. Emergency running insert according to claim 14, wherein the side surfaces of the clamping plate extend in a tapering manner.

16. Pneumatic-tyre-vehicle rim with inserted emergency running segments according to any one of claims 1 to 15, which rim is constructed with lateral wheel flanges projecting upwards and outwards and at least the end sections of the sidewalls of the inserted box section extend with an inward inclination so as to form a wedge, wherein the inclination of the said sidewall sections is greater than that of one part of the opposing wheel flange inner wall, in order to form a gap narrowing from the rim bed outwards between rim and emergency running segment, in which gap a tyre bead can be clamped.

17. Emergency running insert substantially as described hereinbefore with reference to, and as shown in either of the accompanying drawings.